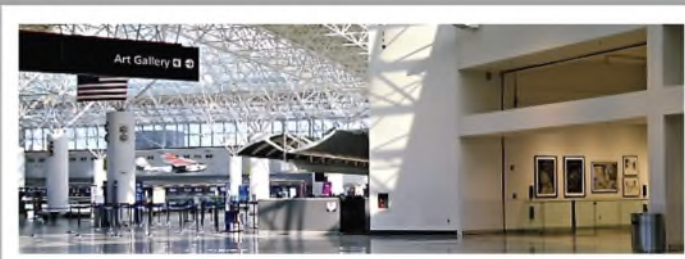


QUARTERLY NOISE REPORT FOURTH QUARTER 2018



The Maryland Department of Transportation Maryland Aviation Administration
OFFICE OF ENVIRONMENTAL SERVICES



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Definitions

Maryland Department of Transportation Maryland Aviation Administration (MDOT MAA): Operator of Baltimore/Washington International Thurgood Marshall Airport (BWI Marshall Airport).

Decibel (dBA): A unit of measurement of sound pressure adjusted for the

human ear's response to particular frequencies.

Day-Night Average Sound Level (DNL or Ldn): A descriptor of 24-hour noise (midnight to midnight) that adds a ten-decibel (dB) nighttime penalty to noise events which occur between the hours of 10 p.m. and 7 a.m. to account for the intrusive nature of noise at night.

Airport Noise Zone (ANZ): An area of land surrounding the airport within which noise levels are equal to or greater than DNL 65 dBA.

Code of Maryland Regulations (COMAR): Requires MDOT MAA to control development in areas where noise levels are DNL 65 dBA or more.

Summary

This report provides a review of the aviation noise program for the 4th Quarter of 2018 (October 1 to December 31). Included in this report is information on jet aircraft operations, observance rates for noise abatement procedures, complaints received about aircraft noise, and community outreach efforts by the Maryland Department of Transportation Maryland Aviation Administration (MDOT MAA). The table below displays various measurements in comparison to the 4th Quarter of 2017.

Measurement	4 th Quarter (2018)	4 th Quarter (2017)
Average Daily Jet Operations	665	670
Average Daily Night-time Operations	119	102
Complaints to Noise Office	97,832	5,808
West Flow Operations	75%	75%

News Items of Interest

- ⇒ Snow removal crews at BWI Marshall Airport are getting ready for the daunting task of removing tons of snow in a matter of minutes. Each winter, more than 140 workers and 120 pieces of equipment stand guard at the airport to fight off what Mother Nature throws at them.

"We have plows, brooms, blowers and chemical trucks that we used to remove snow from the airfield and our roadway system," said Wayne Pennell, Chief Operating Officer for BWI Marshall Airport. The equipment is massive, with blades more than 30 feet wide. While most trucks simply plow, there are others that plow, broom and blow snow all at once. The trucks will travel in a caravan, closing down one runway to clear it, then the other, all while under time constraints put in place by the FAA.

"We're regulated to be able to move 1 inch of snow off all of our Priority 1 surfaces within 30 minutes, so teams are working constantly," Pennell said. The same types of trucks are used to clear parking lots and roads around the airport. Employees train year-round. In the last almost 10 years, the airport has only had to close for snow one time.

- ⇒ BWI Marshall Airport continues to set records for passenger traffic, with new airlines and service to new markets. Following three-straight record years, passenger traffic has continued to grow in 2018. Through September 2018, the airport has set new monthly passenger records in 38 of the past 39 months.
- ⇒ Frontier Airlines recently announced plans for nonstop flights from BWI Marshall Airport to Denver, beginning March 14, 2019. The airline will initially offer four weekly roundtrips using its Airbus A320 aircraft.
- ⇒ jetBlue announced 2019 route changes, including offering five daily flights to Boston beginning in January 2019, and discontinuing daily flights to Orlando and Fort Lauderdale.
- ⇒ Spirit Airlines will begin nonstop service to Austin, TX, Jacksonville, FL, and San Juan, Puerto Rico on February 14, 2019, and has announced new service to Raleigh, NC, beginning May 2, 2019.



Airport Operations

This section presents information on the level of operational activity at BWI Marshall Airport; including air traffic levels by jet aircraft, runway use, and flight corridors.



Jet Operations and Nighttime Activity

The first figure shows the average number of daily jet flights at BWI Marshall Airport, including arrivals and departures by business jets and air carrier aircraft. The figure also presents data for the preceding nine months, for a twelve-month total. The average daily number of jet operations during the 4th Quarter of 2018 was 665.

The next figure presents nighttime air carrier, business jets and cargo jet operations. At BWI Marshall Airport, a nighttime operation is defined as an arrival flight or departure flight that occurs between the hours of 10 p.m. and 7 a.m. The average number of nighttime jet operations was approximately 119 per night during the 4th Quarter of 2018.

Average Daily Jet Operations



Average Nightly Passenger & Cargo Operations



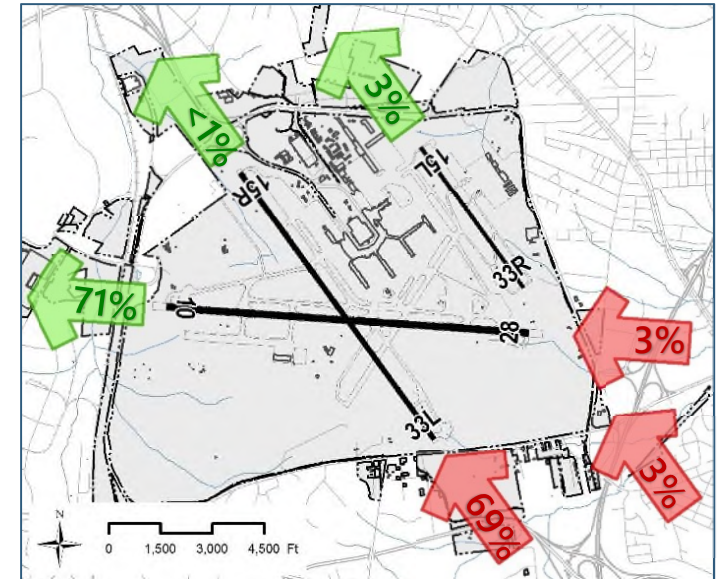
Runway Use

The MDOT MAA maintains a preferential runway use program to minimize the aircraft noise impact on neighboring communities. For noise abatement purposes, west flow (aircraft departures to the west) is preferred. Prevailing wind speed, direction and weather factors determine the direction of air traffic flow. Aircraft usually take off and land into the wind to meet safety and operational requirements. The figures to the right show jet runway use for the 4th Quarter of 2018.

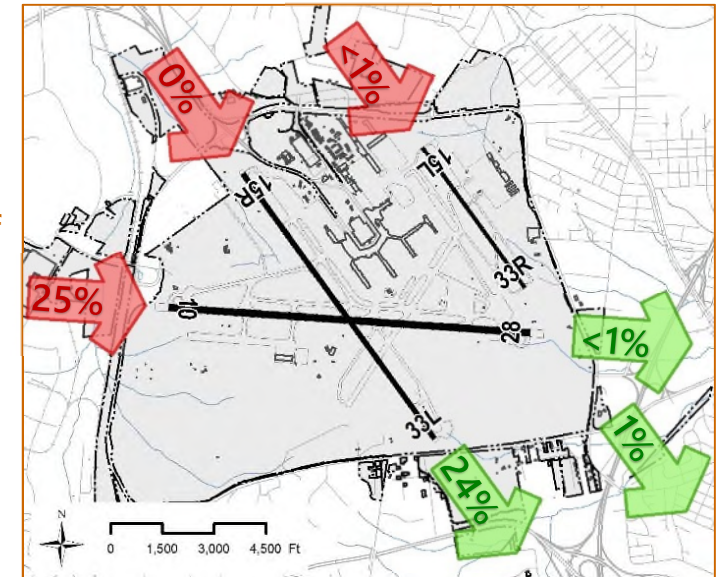
During west flow, all jet aircraft primarily depart (green arrows) from Runway 28 and arrive (red arrows) on Runway 33L, as shown in the top figure to the right. Historical trends result in annual average west flow of about 70%.

During east flow, all jet aircraft primarily depart (green arrows) from Runway 15R and arrive (red arrows) on Runway 10, as shown in the bottom figure to the right. Historical trends result in annual average east flow of about 30%.

**West Flow
Runway Use**
75% in Fourth Quarter 2018
(Historical Annual Average of 70%)



**East Flow
Runway Use**
25% in Fourth Quarter 2018
(Historical Annual Average of 30%)

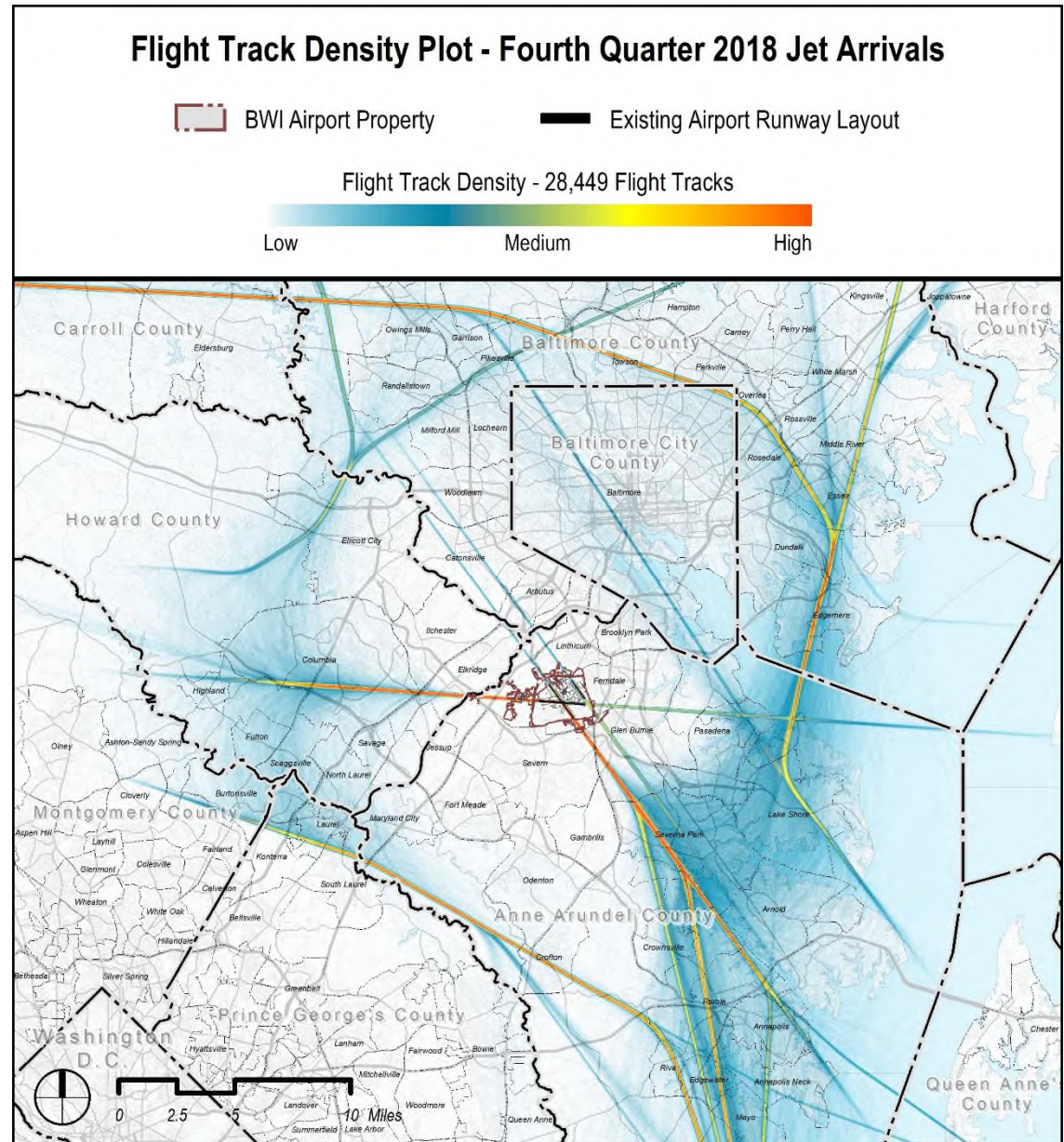


Flight Corridors – Jet Arrivals

The following figures depict the flight corridors at BWI Marshall Airport for jet arrivals and jet departures as derived from BWI Marshall Airport's Noise and Operations Monitoring System (NOMS).

The figure to the right shows jet arrivals during the 4th Quarter of 2018.

This flight track density plot uses color gradations to depict the flight track geometry, dispersion, and relative frequency of overflights. The color ranges are assigned based on the relative density of aircraft operations. Orange shows the highest density of flights, fading to yellow and then blue as the density decreases.





Flight Corridors – Jet Departures

The figure to the right shows jet departures during the 4th Quarter of 2018.

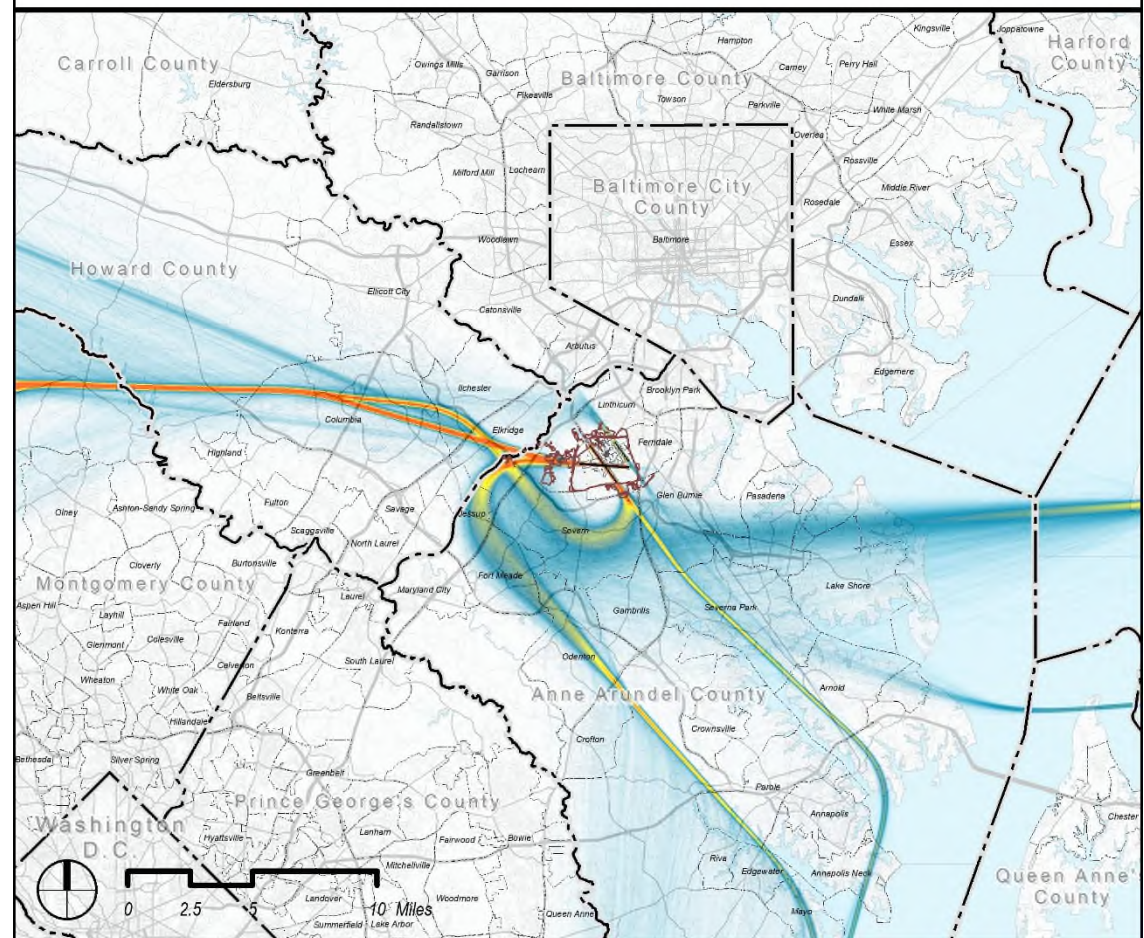
This flight track density plot uses color gradations to depict the flight track geometry, dispersion, and relative frequency of overflights. The color ranges are assigned based on the relative density of aircraft operations. Orange shows the highest density of flights, fading to yellow and then blue as the density decreases.

Flight Track Density Plot - Fourth Quarter 2018 Jet Departures

 BWI Airport Property  Existing Airport Runway Layout

Flight Track Density - 28,553 Flight Tracks

Low Medium High





Observance of Noise Abatement Procedures

The graphs to the right show how the major carriers and cargo operators perform on the two noise abatement procedures of most interest to the local communities. These procedures are:

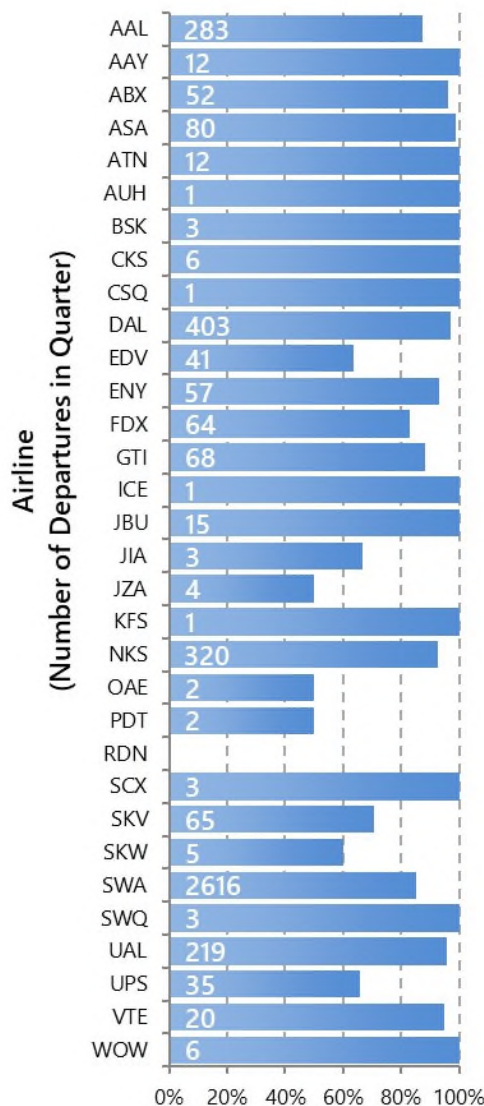
1. Runway 15R departures initiating their right turns at, but not prior to, 1 DME
2. Runway 28 departures initiating their turns at, but not prior to, 3 DME

The graphs show the percentage of flights for each airline which comply with each of the two procedures. Each bar also provides the number of operations by each airline subject to the noise abatement procedure. DME stands for Distance Measuring Equipment, and is the measured slant range from the aircraft to the navigational aid located near the center of the Airport. One DME equals one nautical mile.

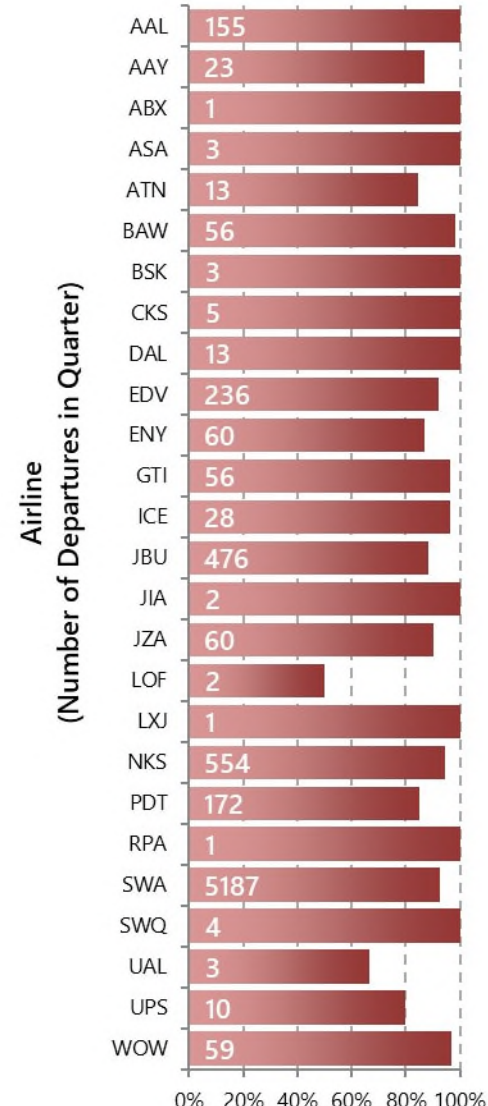
For the 4th Quarter of 2018, 87% of departures turning right from Runway 15R initiated their turns beyond 1 DME.

For the 4th Quarter of 2018, 92% of departures turning left from Runway 28 initiated their turns beyond 3 DME.

Percentage of Runway 15R Departures
Turning Right Beyond 1 DME - 4th
Quarter 2018



Percentage of Runway 28 Departures
Turning Left Beyond 3 DME - 4th
Quarter 2018





Outreach and Community Involvement

The MDOT MAA engages in on-going efforts to enhance the level of communication and interaction between the Airport and area residents.

The MDOT MAA Community Outreach Programs encourage the exchange of information between the MDOT MAA and local community groups and residents. These programs supplement the efforts of the BWI Marshall Airport Neighbors Committee to promote the active participation of local residents in Airport issues.

Specific services or activities provided by the MDOT MAA are listed in the table to the right along with the number of events or recorded reports.



DC Metroplex BWI Community Roundtable

The DC Metroplex BWI Community Roundtable is an MDOT MAA initiative formed at the request of the Federal Aviation Administration (FAA).

More information about the Roundtable, including meeting agendas, past meeting minutes, and presentation materials, is available at www.maacommunityrelations.com.

Public Education & Activities – 4th Quarter of 2018

Committee Meetings	2
Community Meetings	1
Community Noise Monitoring Reports	2
Airport Zoning Permits	111
eNews Express notifications	15



Roundtable Meetings – 4th Quarter of 2018

- October 9, 2018
 - MDOT MAA update on status of detailed technical analysis of FAA procedure designs
 - Recent Roundtable communication with the FAA
 - Updates on FAA Reauthorization Act
- December 4, 2018
 - MDOT MAA presentation of detailed technical analysis of FAA proposed procedure designs
 - Roundtable discussion of FAA proposed procedure designs and response to FAA



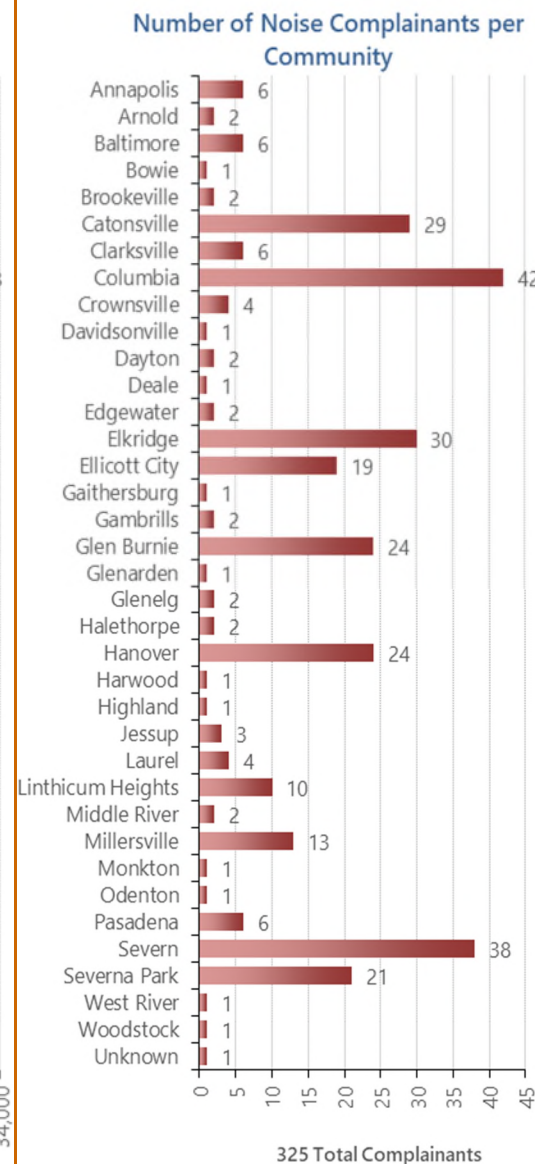
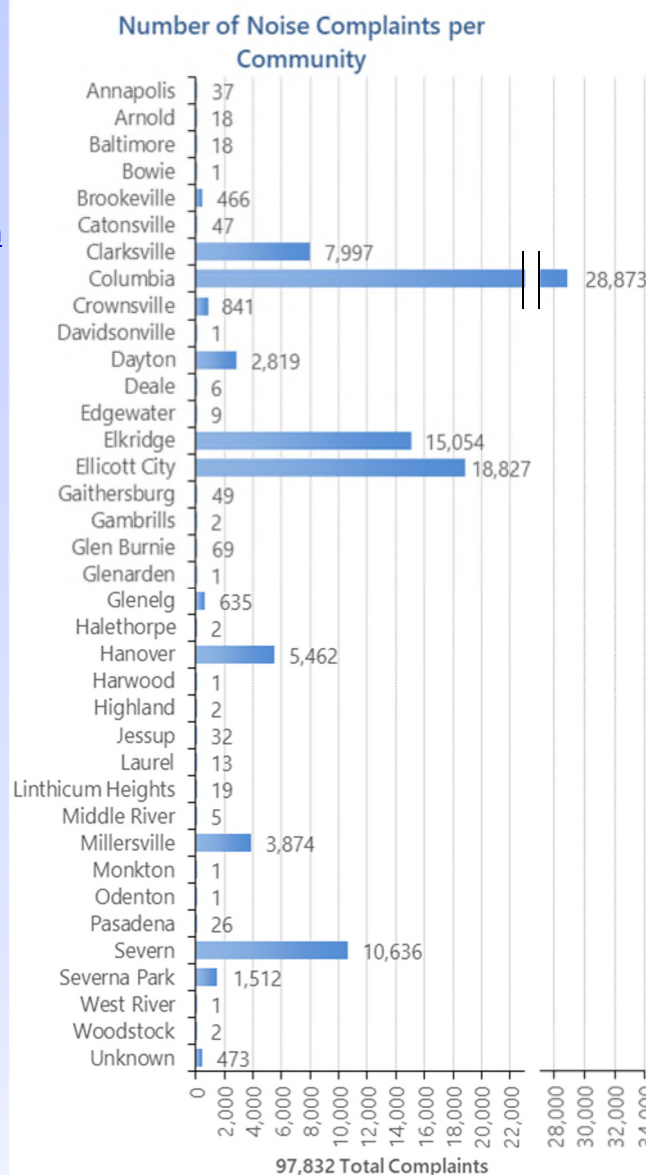
Airport Noise Complaints

The MDOT MAA maintains a 24-hour Airport Noise Hotline at 410-859-7021. Noise complaints can also be entered online at:

<http://www.maacommunityrelations.com/content/anznoiseupdate/noiseform.php>

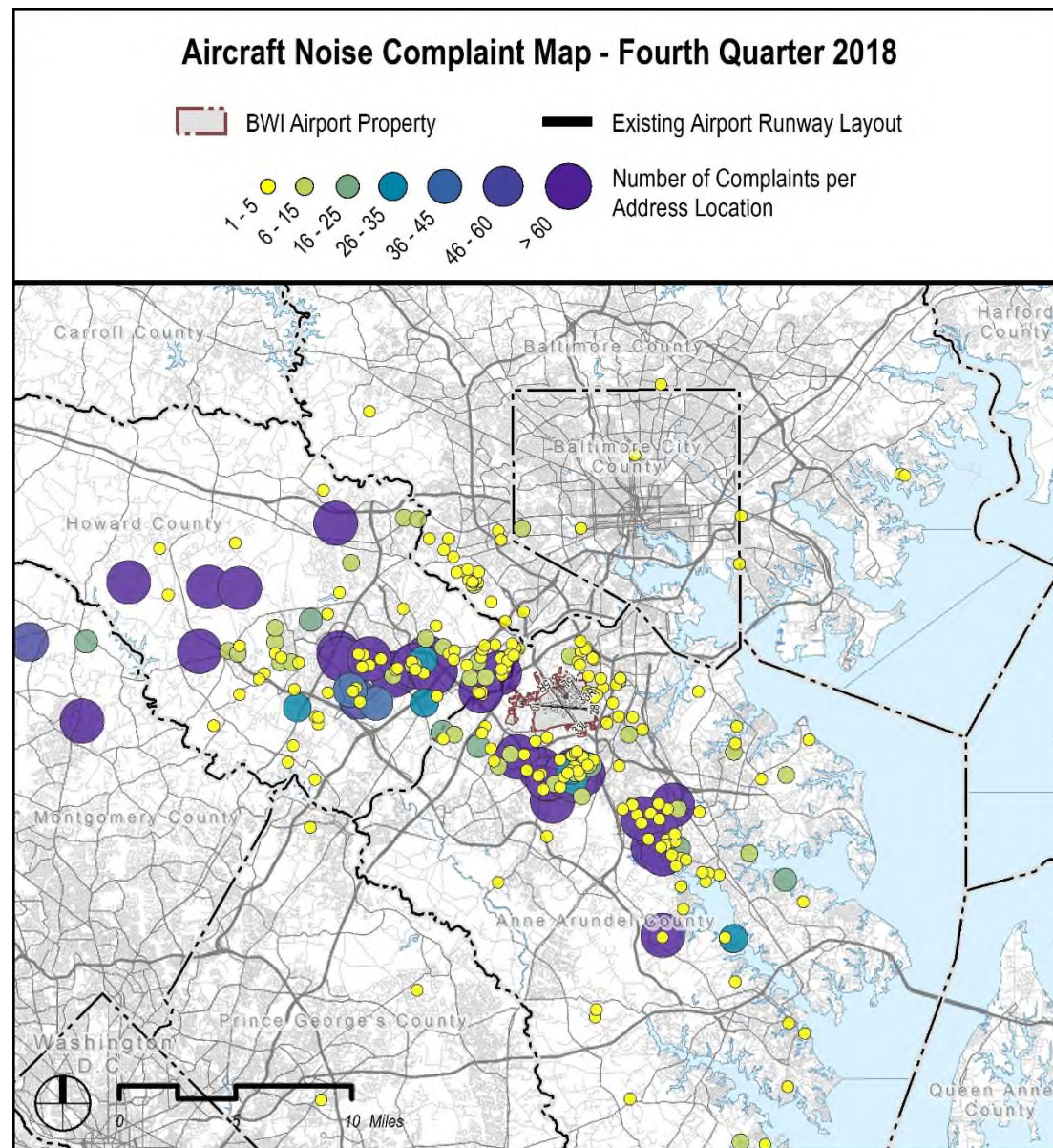
The graphs show the number of complaints and complainants per community for the quarter.

There were 97,832 complaints (325 complainants) during the 4th Quarter of 2018.





The map to the right shows the locations and number of complaints for the 4th Quarter of 2018. The size and color of each caller location denotes the number of times a complaint was submitted during the quarter. Small yellow circles depict locations with fewer complaints while large darker circles depict greater numbers of complaints.





BWI Neighbors Committee

The BWI Marshall Airport Neighbors Committee was established in December 1983 and serves as a liaison between the Airport and the surrounding communities to ensure continuing and timely discussion of mutual airport and community interests.

The Committee serves as a forum for exchanging information, ideas and suggestions. Examples of interests include ground access (highways, light rail, etc.), long-range transportation planning, operational changes (construction, maintenance and air traffic control), noise abatement and other environmental issues, parking and ground transportation, and land use planning.

Community Enhancement Grant Program

The Annotated Code of Maryland, Transportation §5-414 provides for an 11-member "Citizens Committee for the Enhancement of Communities Surrounding Baltimore/Washington International Thurgood Marshall Airport."

This legislation benefits citizens living within the 1998 certified Airport Noise Zone or within two miles of the outermost noise contour by allowing them to apply for grants for transportation-related projects such as sidewalks, speed humps, street lights, etc. The grants awarded under this program are made by the Secretary of the Maryland Department of Transportation.

BWI Neighbors Committee Community Groups



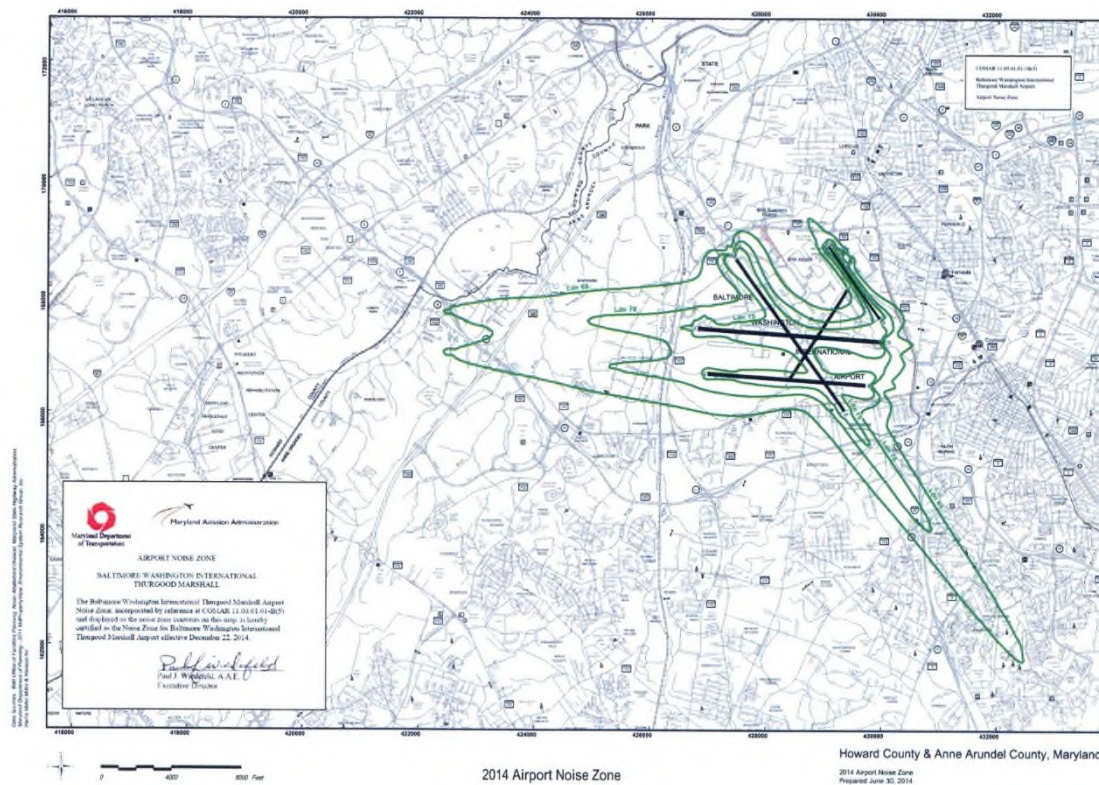
Grants 19-05 and 19-07 totalling \$15, 874 were approved for recommendation.



Airport Noise Zone

The Maryland Environmental Noise Act of 1974 provides for the protection of citizens from the impact of transportation-related noise. The aviation portion of the Act requires the MDOT MAA to create a certified Airport Noise Zone (ANZ) to control incompatible land development around BWI Marshall Airport and a Noise Abatement Plan (NAP) to minimize the impact of aircraft noise on people living near the Airport. An ANZ and NAP were first established for BWI Marshall Airport in 1976. Both were updated in 1982, 1988, 1993, 1998, and 2007. The latest update to the ANZ became effective on December 22, 2014.

The ANZ is determined by a composite of three noise contours: a base year contour, a five-year forecast, and a ten-year forecast. The largest of the three contours in any area around the Airport determines the outline of the ANZ, thereby offering protection within the largest of the existing or future noise contours. The contours depict the Day-Night Average Sound Level (DNL) around BWI Marshall Airport. Both the State of Maryland and the FAA require the use of the DNL metric by all airports conducting environmental studies. The current 2014 ANZ is depicted to the right.



Further information on the ANZ can be found here:

<http://www.maacommunityrelations.com/content/anznoiseupdate/bwianz.php>

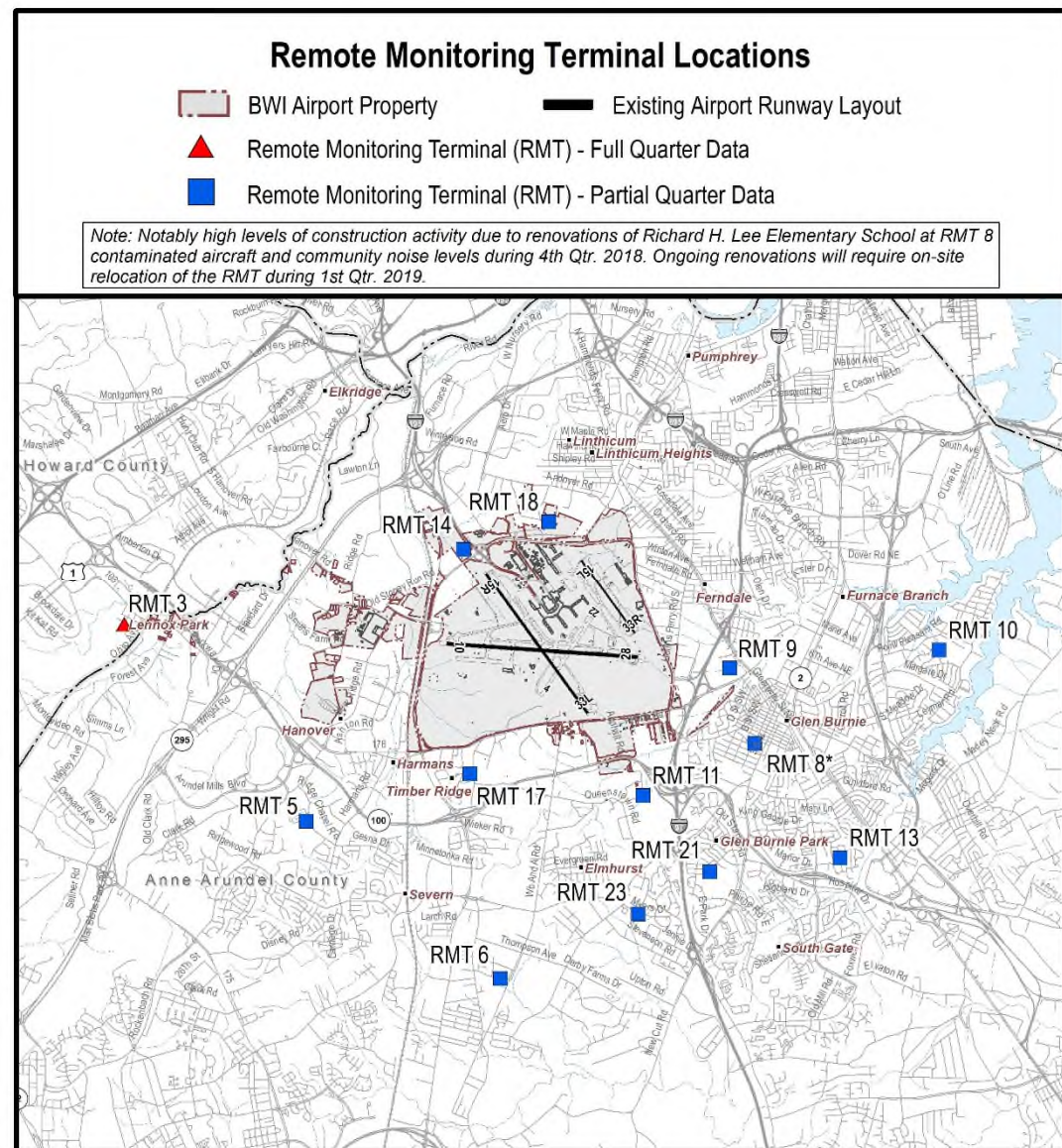


Noise Monitoring Program

MDOT MAA is transitioning to a new Noise and Operations Monitoring System, which includes replacement of BWI Marshall Airport's legacy remote monitoring terminals. The figure to the right presents the locations of the active permanent noise monitors for the 4th Quarter of 2018 from the NOMS. Blue squares represent RMT's that reported data for a portion of the 4th Quarter, while red triangles reported data for the full duration of the 4th Quarter.

The term DNL (symbolized as "Ldn" in mathematical equations) means Day-Night Average Sound Level, and is used to report aircraft, community and total noise levels. DNL is defined as the cumulative sound energy averaged over a twenty-four hour period, with ten-decibels (dB) added to noise events which occur between the hours of 10 p.m. and 7 a.m. This penalty accounts for the greater impact of noise events which occur at night. DNL is measured from midnight to midnight.

The table on the following page provides the quarterly Aircraft, Community, and Total DNL values at each site. At some sites, community or environmental noise levels (street traffic and other neighborhood noises) exceed aircraft noise levels.





Fourth Quarter 2018 DNL Values				
RMT#	Location	Aircraft DNL (dBA)	Community DNL (dBA)	Total DNL (dBA)
3	Lennox Ave., Dorsey	64	61	66
5 ¹	Harmans Elementary School	52	58	59
6 ¹	Delmont United Methodist Church	53	55	57
8 ³	Richard H. Lee Elementary School	-	-	63
9 ²	Army National Guard Armory	55	69	70
10 ¹	Pumping Station, Margate	46	54	54
11 ¹	Jones Rd., Queenstown	70	64	71
13 ¹	Woodside Elementary School, Glen Burnie	48	58	58
14 ¹	Outer Approach End Rwy 15R	58	66	66
17 ¹	Timber Ridge Rd., Timber Ridge	42	59	59
18 ²	Approach End Rwy 15L	60	61	63
21 ¹	Glen Burnie Park Elementary School	63	61	65
23 ¹	Quarterfield Elementary School	57	59	61

¹ RMT DNL values represent partial quarter from November 7th, 2018 to December 31st, 2018.

² RMT DNL values represent partial quarter from October 1st, 2018 to October 30th, 2018.

³ Notably high levels of construction activity due to renovations of Richard H. Lee Elementary School at RMT 8 contaminated aircraft and community noise levels during 4th Qtr. 2018. Ongoing renovations will require on-site relocation of the RMT during 1st Qtr. 2019.